



Flight Opportunities

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FAA Commercial Space
Transportation Conference

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STMD Technology Pipeline



Technology Development

- *Game Changing Development (GCD)*

Commercial Partners Portfolio

- *Flight Opportunities (FO)*
- *Centennial Challenges (CC)*
- *SBIR/STTR*
- *Reg. Economic Development (RED)*

Low TRL

Mid TRL

High TRL

Early Stage Portfolio

- *NASA Innovative Advanced Concepts (NIAC)*
- *Space Technology Research Grants (STRG)*
- *Center Innovation Fund (CIF)*

Technology Demonstrations

- *Technology Demonstration Systems*
- *Small Spacecraft Technologies*

TECHNOLOGY PIPELINE

Investment in
commercial
(flight) partners
enables us to
mature
technology
through flight
demonstration.



VTOL



Balloon



sRLV



SL10 launch

November 6, 2015

Spaceport America, NM

UP Aerospace Deploys NASA's Maraia
Earth Return Capsule

Video:

<https://www.youtube.com/watch?v=AEwKOeCj0jU>



Who are the Customers?



Flight Demonstration Customers

The suborbital and orbital research and technology development community:

1. Academia

2. Industry

Private Entities (for & non-profit)

3. Research Institutes & FFRDC (incl JPL)

4. International Partners (w/ U.S. Lead)

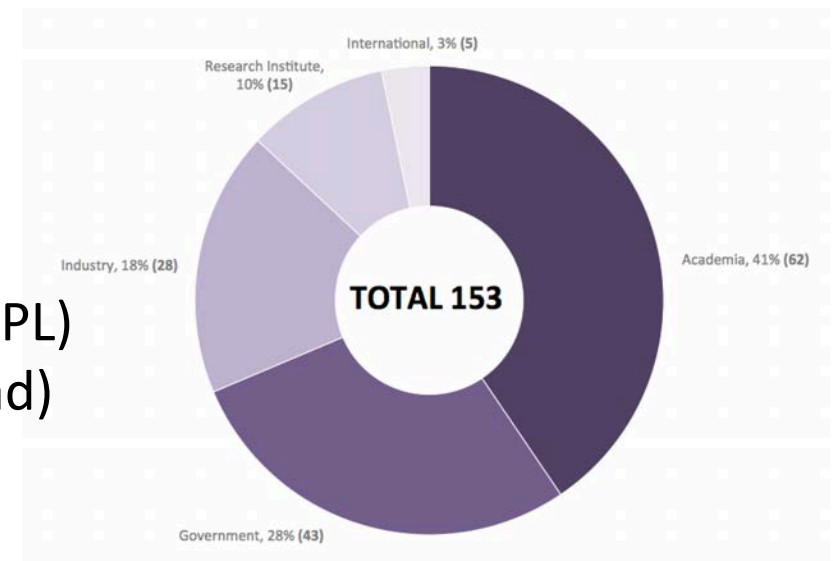
5. U.S. Government

NASA Centers

STMD Programs

Other NASA Mission Directorates

Other Government Agencies



FY11-15 customers



Entry Points for Payloads



A. Solicited (Use any Qualified U.S. Vehicle)

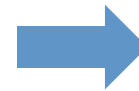
1. Academia

2. Industry

Private Entities (for & non-profit)

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**SpaceTech-REDDI
NRA Appendix F**

B. Directed (Use IDIQ2 Vehicles)

5. U.S. Government

NASA Centers

STMD Programs

Other NASA Mission Directorates

Other Government Agencies



**NASA Internal
Process**

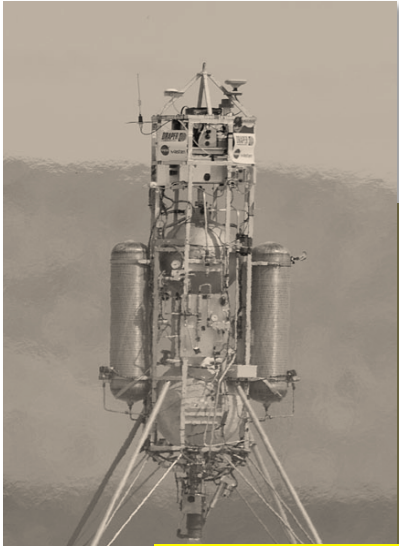


Five IDIQ2 Flight Providers



Masten Space Systems

Xombie, Xodiac



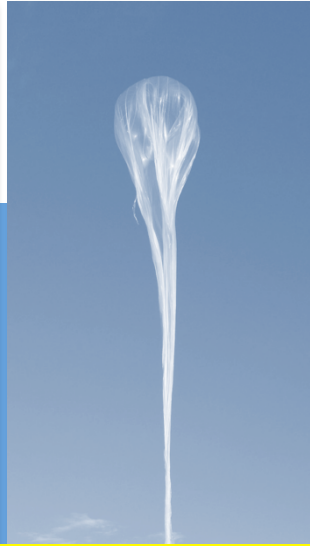
Near Space Corporation

Small/Nano Balloon System



World View

Tycho-20, Tycho-285



UP Aerospace

SpaceLoft-XL



Virgin Galactic

SpaceShipTwo



Next on-ramp opportunity – proposals due March 18, 2016
flightopportunities.nasa.gov/onramp

VTOL

Balloon

sRLV



External REDDI Flight Providers



Blue Origin
New Shepard



Exos Aerospace
(formerly Armadillo)
SARGE



Zero
G-For

Next REDDI-F1 opportunity – proposals due March 8, 2016

flightopportunities.nasa.gov/reddi



**Integrated
Spaceflight Services**
S3 Aircraft



Commercial Space Technology Dev.



- **Announcement of Collaborative Opportunity (ACO)**
 - Partnership Awards to 12 companies, November 2015
 - Access to NASA expertise and facilities through non-reimbursable Space Act Agreements
- **Topic 1 Nanosatellite and Suborbital Reusable Launch Systems Development (FO Awards)**
 - Technology Maturation and Flight Validation for Air Launched Liquid Rockets -- Generation Orbit Launch Services, Inc.
 - LauncherOne Collaborative Opportunity to Advance Emerging Space Capabilities -- Virgin Galactic LLC
 - Spyder: A Dedicated CubeSat Launcher Project -- UP Aerospace, Inc.
- **Topic 5 Small, Affordable, High Performance Liquid Rocket Engine Development**
 - Enhancement of Nanosat Launch Vehicle Booster Main Engine Using 3D Additive Manufacturing Techniques – Garvey Spacecraft Corp
 - Hydrogen Peroxide/Kerosene Engine Development – Dynetics, Inc.

STMD Market Research RFI – responses due Feb 25, 2016
flightopportunities.nasa.gov/marketresearch



FY2016 and Beyond



- Program will continue to utilize and foster U.S. commercial sRLV capabilities
- Program expects to on-ramp flight providers annually
- Program funds PIs to purchase flights directly from U.S. commercial flight vendors
- With increasing demand for flights, the program will support additional flights on suborbital reusable platforms, conducting one or more flights every month

Web: <http://flightopportunities.nasa.gov>

Annual Reports: <https://issuu.com/nasafo>

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